PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJITSU LTD

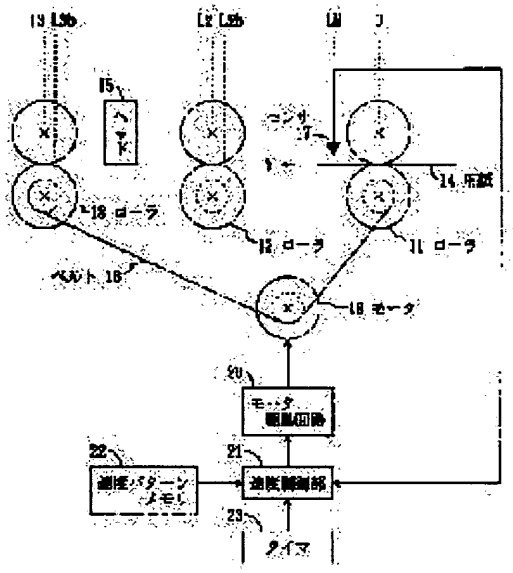
(72)Inventor : TENKAI TAMIO
OKITA TOMOMI

(54) MEDIUM CONVEYANCE CONTROL DEVICE

(57)Abstract:

PURPOSE: To keep a medium speed at a constant value by a method wherein, based on a detected medium position and the arrangement position of a conveyance roller, the number of rollers to cut through a medium for conveyance is discriminated and a rotation command speed responding to the number of rollers is outputted to a motor.

CONSTITUTION: A speed control part 21 outputs a rotation command speed, responding to a speed V, to a motor drive circuit 20 until a paper sheet 14 is conveyed to a sensor 17. As a result, after the paper sheet 14 cut through by a roller 11, the paper sheet is conveyed at a speed V. A timer 23 is restarted by a speed control part 21 by means of a paper detecting signal from the sensor 17. By referring to a speed pattern memory 22 each time a timing signal is outputted from the timer 23, a corresponding rotation command speed is outputted. In this way, a motor 18 is run according to the content of a speed pattern memory 22, and when movement of the paper sheet 14 is completed, the motor 18 is stopped. The paper sheet 14 is always conveyed at the speed V and printing or reading precision by a head 15 is improved.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] Two or more conveyance rollers which are characterized by providing the following and by which a rotation drive is carried out by one motor (33), respectively (31 32) Medium transport device which bites a medium (34) one by one and conveys it. The medium position detecting element which is medium transfer-control equipment which controls this motor and performs the transfer control of this medium, and detects a medium position (36) The speed-control section which distinguishes the number of rollers which bites this medium and is conveying it based on the medium position and the arrangement position of this conveyance roller which were detected, and outputs the rotation instruction speed according to this number of rollers to this motor (35)

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention is a printer. It is related with improvement of the medium transfer-control equipment in medium transport devices, such as an image reader.
[0002] In the medium transport device in the image reader which reads an image data, conveying the printer and form which are printed conveying a medium (following form), each roller is arranged so that two or more rollers which convey a form may be formed and a form may straddle at least one or more rollers to the conveyance direction. And the rotation drive of these rollers is usually carried out by the reasons of a cost cut etc. by one motor.
[0003] Although the number of the rollers which bite a form, i.e., the number of the rollers which participate in conveyance, changes in such a medium transport device as a form is conveyed, if the drive capacity of a motor is small, change of the number of rollers to bite will act as a load effect of a motor, and a bearer rate will change.
[0004] Therefore, since printing precision and the accuracy of reading become bad, the simple medium transfer-control equipment which prevents change of the bearer rate of the medium by such cause is called for.
[0005]
[Description of the Prior Art] Drawing 5 is explanatory drawing of the conventional example, conveying a form 4 with the rollers 1 and 2 of the diameter of the same, scans a head 5 in the direction of a line (it is perpendicularly to drawing), and shows the cross section of the medium transport device in the equipment which performs printing or image read.
[0006] The roller 1 shown in drawing 5 and the roller 2 confronted 2 sets of rollers used as the pair of the diameter of the same, and as shown in drawing 5 , they are connected with the axis of rotation of a motor 3 with the belt 6, respectively, so that the form 4 conveyed, respectively may be bit. For this reason, if a motor 3 is rotated, since a roller 1 and a roller 2 are the diameters of the same, it will rotate with the same rotational speed, and the form 4 bit, respectively will be conveyed at the same speed.
[0007] the form 4 sent in and bit by the roller 1 -- ** -- after being conveyed in the direction of a head only with a roller 1, ** continuing first and being conveyed by both a roller 1 and the roller 2, the ** last is discharged after being conveyed only with a roller 2 And it is scanned and printed by the head 5 in the meantime (or read).
[0008] In addition, as a motor 3, a stepping motor or a DC motor is used and drives based on a directed fixed rotation instruction speed.
[0009]
[Problem(s) to be Solved by the Invention] Generally in the medium transport device explained above, there is a relation of V1 >=V2 to the form speed V2 at the time of biting a medium 4 only on a roller 1 (or roller 2), and conveying it on it at both the form speed V1 at the time of biting, conveying and being and the roller 1 and the roller 2. If the bit number of rollers increases, the load of a motor 3 becomes large, this is based on the reasons of the rotational speed according to rotation instruction speed not being obtained, and as shown in drawing showing the conventional example of a bearer rate of drawing 6 , whenever a form bites on a roller like a roller 1, a roller 2, and a roller 3, speed falls under fixed rotational-speed instructions. And also experientially, this is proved.
[0010] When it comes to V1>V2, while a print pitch and a read pitch print, it is changing into read and printing precision and the accuracy of reading fall. Although there is the method of enlarging drive capacity of a motor 3 etc. as a method of solving this technical problem, if a large motor is used while causing a cost rise, the technical problem that noise becomes large will also be generated.
[0011] Moreover, although performing feedback control which detects form speed (or position) continuously and is maintained at constant speed is also considered, a speed encoder etc. is needed and equipment from the first causes a cost rise in a simple thing.

[0012] this invention aims at offering the simple medium transfer-control equipment which keeps medium speed constant, when driving two or more rollers by one motor and conveying a medium in view of the above-mentioned technical problem.
[0013]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the medium transfer-control equipment of this invention Two or more conveyance rollers 31 and 32 by which a rotation drive is carried out by one motor 33 as shown in the principle view of this invention of drawing 1 In the medium transport device which bites a medium 34 one by one and conveys it The medium position detecting element 36 which is medium transfer-control equipment which controls a motor 33 and performs the transfer control of a medium 34, and detects a medium position, The medium position and the conveyance rollers 31 and 32 which were detected Based on an arrangement position, the number of rollers which bites this medium 34 and is conveying it is distinguished, and it constitutes so that it may have the speed-control section 35 which outputs the rotation instruction speed according to this number of rollers to a motor 33.
[0014]
[Function] The medium position detecting element 36 detects the position of the medium 34 currently conveyed, and the speed-control section 35 distinguishes the number of rollers which bites a medium 34 and is conveying it from this medium position and arrangement position of a roller that were detected, and it outputs the rotation instruction speed corresponding to the number of rollers to a motor 33. In addition, this rotation instruction speed is experimentally defined according to a medium transport device in fact.
[0015] Since the part rotation instruction speed is raised and can be compensated even if the load of a motor 33 increases, rotational speed falls and medium speed falls by the above, medium speed can be kept constant by the simple method, without performing feedback control etc.
[0016]
[Example] Hereafter, the example of this invention is shown in detail using drawing. In addition, the same sign expresses the same object through a complete diagram. Drawing and drawing 4 to which drawing 2 expresses the block diagram of one example, and drawing 3 expresses the example of a rate pattern are a control flow chart view.
[0017] Drawing 2 shows one example of three rollers 11, 12, the medium transport device that conveys a form 14 by 13, and its control unit. Here, 11, 12, and 13 are the conveyance rollers (following roller) which convey a form 14, they have the same diameter, and are connected with the axis of rotation of a motor 18 like illustration with the belt 16, and rotate with the same rotational speed by rotation of a motor 18.
[0018] 18 is a motor, for example, a stepping motor etc. is used. 15 is a head for printing (or for read), is prepared between a roller 12 and a roller 13, and is scanned in the direction of a line of a form 14 (perpendicular direction of drawing).
[0019] 17 is a sensor and the nose of cam of a form 14 is LM point (it is the distance to the conveyance direction, using the center of a roller 11 as criteria position "0"). It detects having reached. 20 is a motorised circuit and performs the roll control of a motor 18 based on the rotation instruction speed outputted from the speed-control section 21.
[0020] 22 is rate-pattern memory and the value of rotation instruction speed is recorded corresponding to the elapsed time (or travel of a unit) of the unit from the form detection by the sensor 17. In addition, although the read-out address of rotation instruction speed carried out the illustration ellipsis, it is based on the address register which carries out stepping for every read-out.
[0021] 23 is a timer and outputs the timing signal of the time interval of the rate pattern stored in the rate-pattern memory 22. 21 is the speed-control section, the form detection by the sensor 17 outputs the rotation instruction speed R1 corresponding to speed V to the motorised circuit 20 as a rotation instruction speed, and after sensor 17 detection outputs the rotational-speed instruction speed based on time progress (travel) to the motorised circuit 20 with reference to the rate-pattern memory 22 by the timing signal outputted from a timer 23.
[0022] what drawing 3 expressed the example of a rate pattern to -- it is -- the installation position of rollers 1-3 -- corresponding -- kind (mainly width of face and length) of form 14 every -- it is prepared And the speed instructions for those values conveying each form 14 by constant speed V are stored on the basis of the sensor 17. That is, rotational speed is set to R1 at first by inrush detection of a form 14, and when the travel after the head of a form 14 passes a sensor 17 is calculated from elapsed time (based on the reading time interval of a pattern), and speed V and it was bit by the following roller, it is the value which changes rotational speed into R2 from R1. In addition, though natural, it is this R1, R2, and R3.. A difference is a value which compensates the slowdown by the number of rollers bit.
[0023] the position where a form 14 is bit by the roller 12 here -- the thickness of a form 14 -- moreover, position L2b to which the front form 14 conveyed contacts a roller 12 from the center of a roller 12 although it changes with press

grades of a vertical roller It sets up. Even if the number of object rollers bit about this point increases, it considers as the same treatment.

[0024] This rate pattern is determined experimentally in fact, is divided for every elapsed time of a unit, is stored in the rate-pattern memory 22, and is read one by one according to time progress. consequently, travel L2b which is conveyance only with the ** roller 11 according to drawing 3 R1 is outputted as a rotation instruction speed. ****** -- ** L2b by which conveyance with a roller 11 and a roller 12 is started from -- before L2 of the center position of a roller 12 The value linearly accelerated from the rotation instruction speed R1 to R2 is outputted, and as for rotation instruction speed, R3 is outputted, after R2 is outputted and rotation instruction speed is bit by the roller 13 which is conveyance with the ** rollers 11, 12, and 13 until it was bit by the roller 13 after that [**].

[0025] In addition, although the number of rollers which will be bit if delivery of a form 14 progresses decreases and rotation instruction speed falls, as shown in drawing 3 , when the calculated travel is set to L4, a rate pattern which is slowed down to R2 is set up. in addition, this time -- distance L4b ****** -- acceleration and deceleration shall be carried out

[0026] Drawing 4 is what showed the flow of bearer rate control action, and is explained below.

(1) The speed-control section 21 outputs the rotation instruction speed R1 to the motorised circuit 20 until a form 14 reaches a sensor 17. Consequently, after a form 14 is bit by the roller 14 at least, it is conveyed at speed V.

(2) By the form detecting signal from a sensor 17, the speed-control section 21 starts a timer 23.

(3) And whenever a timing signal is outputted from a timer 23, output a corresponding rotation instruction speed with reference to the rate-pattern memory 22.

(4) When it does in this way, a motor 18 is driven according to the content of the rate-pattern memory 22 and movement of a form 14 is completed (it judges with a travel and form length, or a form detection sensor is formed independently), suspend a motor 18.

[0027] The above result, a form 14 will be conveyed at speed V from beginning to end, and printing by the head 15 or the accuracy of reading is improved. If the rotation instruction speed according to the number of the rollers contributed to conveyance as mentioned above, i.e., the number of rollers which bit the form 14, increases, and rotation instruction speed will be increased and the number of rollers will decrease, even if it will use a motor with the comparatively weak force by reducing rotation instruction speed, the bearer rate of a form 14 can be kept constant.

[0028] In addition, although a rate pattern is recorded by elapsed time correspondence, and it reads and it was made to carry out, since speed V is set up, a travel can be found and, of course, rate-pattern control can be performed for every travel of a unit.

[0029] Moreover, although the sensor 17 showed the example established one, if it prepares in the arbitrary positions between rollers, it can amend the travel by the operation and the more exact control of it will be attained. Moreover, the size of a form is width of face. The sensor which measures length may be formed and, of course, the value may be inputted.

[0030]

[Effect of the Invention] Like the above, this invention is 1. In the equipment which drives two or more rollers by the motor of **, and conveys a medium, it is what changed the rotation instruction speed given to a motor according to the number of rollers which has contributed to conveyance, and even if it uses a motor with the comparatively weak force, the effect that medium speed can be kept constant is done so.

[Translation done.]

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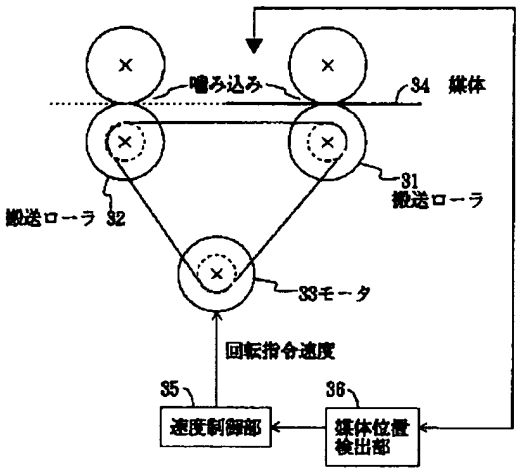
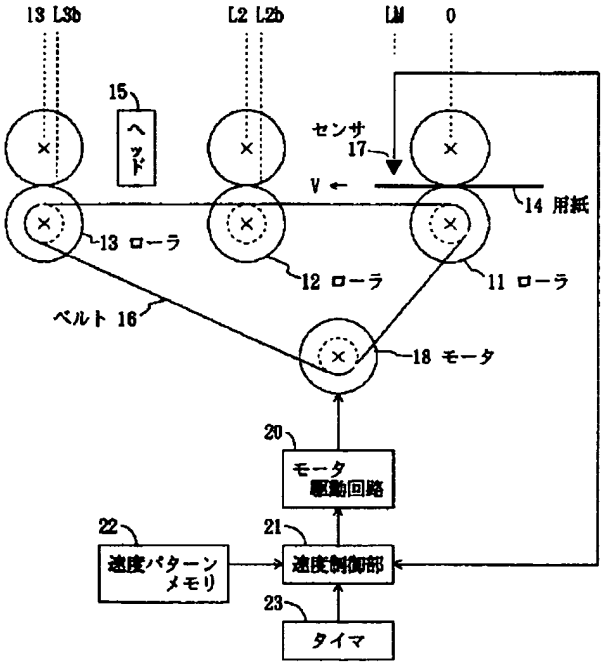
DRAWINGS

[Drawing 1]
本発明の原理図

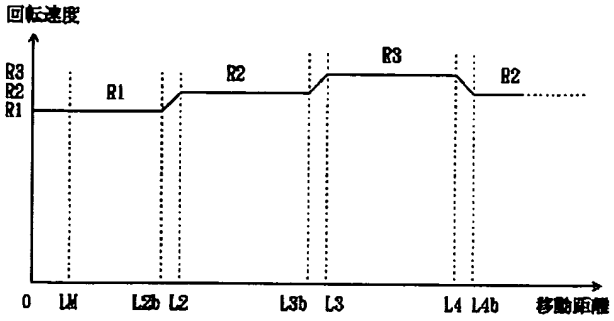


[Drawing 2]
実施例の構成図



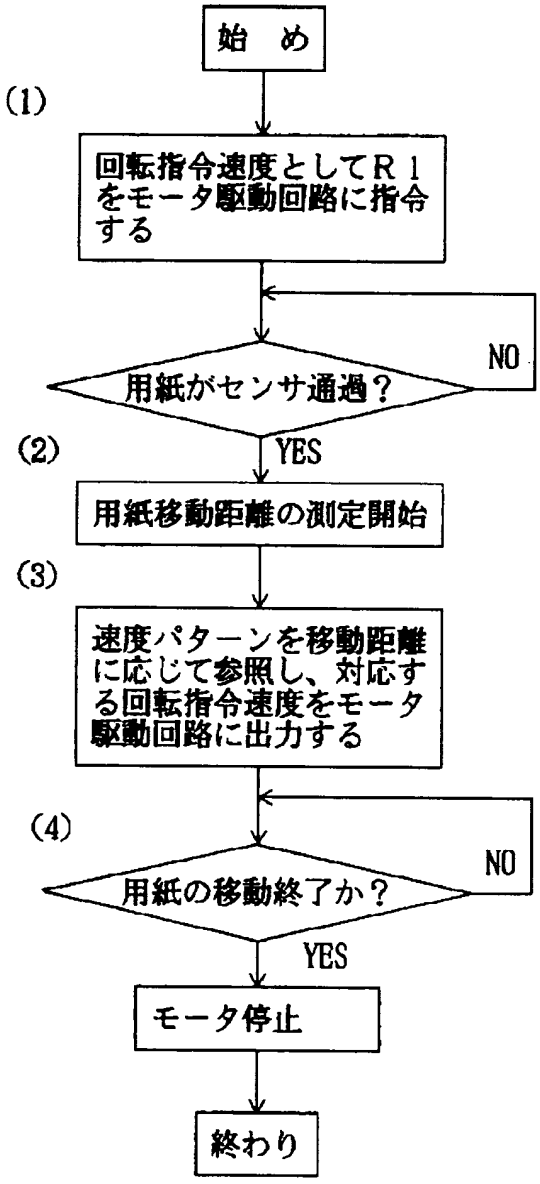
[Drawing 3]

速度パターン例を表す図



[Drawing 4]

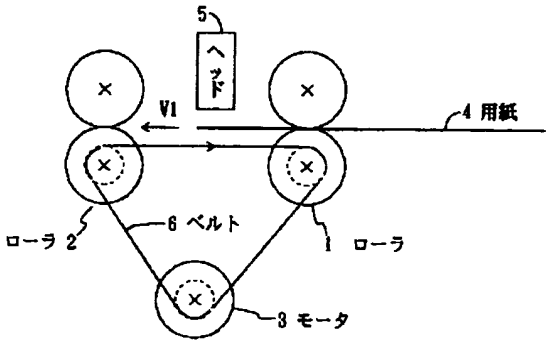
制御フローチャート図



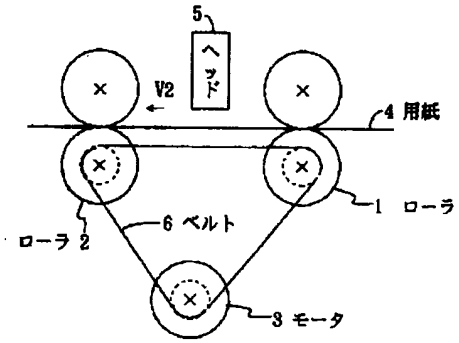
[Drawing 5]

従来例の説明図

(a) 搬送ローラ1個で搬送して場合を表す図

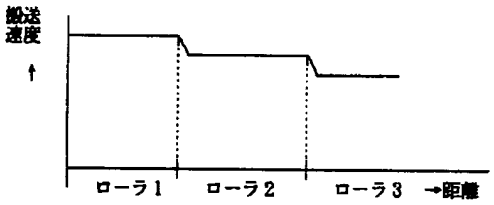


(b) 搬送ローラ2個で搬送している場合を表す図



[Drawing 6]

従来の搬送速度例を表す図



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